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ABSTRACT

Hypotheses were tested regarding the relationship between learning effectiveness in six subject areas and the interaction between student and teacher characteristics. The student-teacher interaction was also examined in relationship to several teaching approaches. Over 1,000 students from 53 different classes with 27 different faculty members participated in the study. Instruments on student and teacher characteristics were administered at the beginning of the semester; most of the measures of learning effectiveness were administered at the end of the semester. The results supported the hypothesis regarding direct relationships between learning effectiveness and student characteristics, instruction characteristics, and teaching methods. Among the student characteristics that showed the strongest positive relationships to learning effectiveness were self-concept of academic ability and internal reinforcement control. Among the instructor characteristics that showed the strongest positive relationships with effective learning was the attitude that education should be oriented more toward a student's interests and concerns than toward mastering the subject matter. With respect to teaching methods, student-directed and structured classes were far superior to instructor-directed and unstructured ones. A 30-item bibliography is included.
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TEACHING EFFECTIVENESS AND THE INTERACTION BETWEEN TEACHING METHODS, STUDENT AND TEACHER CHARACTERISTICS

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ABSTRACT

The study tested hypotheses regarding the relationship between learning effectiveness in six subject areas and the interaction between student and teacher characteristics.The student-teacher interaction was also examined in relationship to several teaching approaches. Learning effectiveness was defined in terms of: interest in subject matter at end of course, interest change, attitude toward subject matter at the end of a course, attitude change,evaluation of course, evaluation of instructor, six month follow-up on perceived value of course, and grade in course.

1034 students from 53 different classes with 27 different faculty members participated in the study. The sample was drawn from a community college with an approximate enrollment of 2000. Instruments on student and teacher characteristics were administered at the beginning of a semester and most of the measures of learning effectiveness were administered at the end of the semester.

The results supported the hypotheses regarding direct relationships between learning effectiveness and student characteristics, instructor characteristics,and teaching methods. Among the student characteristics that showed the strongest positive relationships to learning effectiveness were self concept of academic ability and internal reinforcement control. Among the instructor characteristics that showed the strongest positive relationships with effective learning was the attitude that education should be oriented more toward a students's interests and concerns than mastering the subject matter. With respect to teaching methods, student directed,and structured classes were far superior to instructor directed, and unstructured ones.

Teaching Effectiveness and the Interaction Between Teaching Methods, Student and Teacher Characteristics

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Many studies have been conducted in the past on the effectiveness of various teaching techniques and characteristics of teachers. A few idealized characteristics of teachers as seen by students have been identified in some studies. These, however, are characteristics that have been popularly attributed to the ideal teacher and they seem to change from study to study in regard to which are the most important ones. Little work has been done on teacher attitudes and teaching effectiveness in a college setting and practically no work has been done on the interaction between student-teacher characteristics and teaching effectiveness. This gap in research was recognized nine years ago in The American College (Sanford, 1962), yet not much has been done during the past years to remedy the deficiency.

Research findings suggest that some teachers are effective with large lecture groups while others with small groups. Some classes are successful with audio-visual or automated teaching supplements, others with more personal contact. A study by Coop and Brown (1970) suggests that student cognitive styles do not interact significantly with teaching methods, but that teacher structured presentation methods work better for most students. Tuckman (1969), however, reports that vocational students performed better with non-directive teachers. McMichael and Corey (1969) report that a contingency management technique in general was superior to traditional methods. The contingency method described by Keller (1968) permits each student to progress at his own pace. A student may go to the next unit in the outline only after successful achievement in the previous unit. Again, however, more detailed analysis of teacher characteristics and student characteristics has largely been ignored. That is, the question as to what methods and teacher characteristics go better with what kinds of student characteristics has not been answered.

McKeachie (1961) has found a significant interaction between teaching methods and student characteristics in determining learning effectiveness. However, student characteristics in this study were limited primarily to various motives, such as achievement, affiliation and power and the sample was taken from students at the University of Michigan, a relatively select group.

Recent findings by Chickering (1969) support the view that student characteristics may be an important variable to consider in studying effects of college environment on student attitude change. When one ignores the student characteristics variable, it appears that colleges

in general have little or no effect on student attitudes. However, when one considers the student characteristics variable definite changes become apparent. In the same way, a recent study by Goldberg (1969) suggests that optimal college learning conditions may vary with student personality characteristics. Several pilot studies at Corning Community College have also suggested that student characteristics have to be considered in any attempts to assess learning effectiveness.

The present study proposed to test the hypothesis that in community college students with a wide range of personality variables and abilities there is a significant interaction between college student characteristics, teacher characteristics, methods of teaching, and their effect on learning.

Dependent variables

Learning effectiveness was defined in terms of the following eight areas: interest in subject matter at the end of the course, interest change with respect to course subject matter, attitude toward subject matter in a course at the end of a course, attitude change toward subject matter in a course, student evaluation of course, student evaluation of instructor, six month follow-up on perceived value of course, and grade obtained in course.

It was felt that the traditional method to evaluate learning effectiveness using only grades is not adequate. Often a student forgets quickly much of the content that he has mastered for a course. Besides, grading practices usually differ among instructors. It seemed that other variables such as interest and attitude concerning a course subject matter would be longer lasting and also more meaningful in terms of modern educational objectives.

Independent variables

Student characteristics

1. Internal reinforcement control. This variable was defined as the degree of perception that one's rewards or punishments are contingent on his own behavior efforts. Research at the Corning Community College (Reimanis, 1970a), and unpublished reports from work at Antioch College (Crandall, 1969) using Rotter's I-E scale (1966) have shown no direct grade - internal control relationship in college students. There is a significant relationship, however, between internal control and grades in younger children (Crandall et al., 1965, Reimanis, 1970a). The difference between college students and children with respect to internal control-grade relationship may be partly due to the fact that the measuring instruments have been different. For college students the internal control scale measures the global concept of locus of control as a personality variable while in some studies for children the measure has been more directly related to classroom situations.

Nowicki (1971), using a different scale has found a significant relationship between locus of control and grades for college males. It was felt that since internal control does relate to a number of variables that are relevant in education (Rotter, 1966, Lefcourt, 1966), and since it is difficult to conceptualize how a student who does not have a feeling that his behavior is related to the rewards or punishments that he receives could progress in his academic plans, the concept should contribute toward understanding the interaction between student and teacher variables in affecting learning effectiveness. A report by Reimanis (1970b) cites a significant relationship between internal control and withdrawal rate in college students.

Thus, it was hypothesized that internal control on the part of the student will be related positively to learning effectiveness. Secondly, it was predicted that students high on internality, i.e., having a perception that their own behavior efforts are responsible for most or all of their success or failure, will perform better in a more structured classroom situation as compared to a class with less structure. That is, it was assumed that such students will want to seek out the necessary requirements for a good grade and only a course with a certain structure will permit them to do so, It was felt that students in the middle and low ranges on internal control will not attribute as much importance to structure because to them success or failure is determined partly by chance or luck.

2. Debilitating versus facilitating anxiety. Anxiety was assumed to increase one's drive level. Facilitating anxiety (Haber, 1966) is the kind which motivates the student to be more alert and work harder for his courses and during his exams. Debilitating anxiety, however, is the kind that interferes with the learning process by making a student too preoccupied with his fear to fail in his efforts. Desiderato and Koskinen (1969) have reported a relationship between grades and facilitating anxiety. Lin and McKeachie (1970), however, have shown that such relationships could be largely accounted for by differences in abilities which relate to anxiety and study habits.

It was hypothesized that students high in debilitating anxiety will perform better in situations where there is more instructor directiveness and structure as compared to more student directiveness and less structure. It was assumed that more instructor directiveness and structure would make debilitating anxiety students feel more secure and thus less anxiety would be aroused.

3. Educational philosophy. It was predicted that students would perform better in situations where their educational philosophies are more similar to the philosophies of their instructors than in situations where the philosophies differ. It was assumed that students who have a personal growth philosophy regarding education would feel more involved and fullfilled in

classes where the instructor also holds this view. In the same way, it was assumed that students who are more career oriented will be more motivated to work in classes where the instructor holds the philosophy that college should prepare one for a career.

Secondly, it was hypothesized that students with personal growth orientation will perform better in classes with more student directiveness and less structure as compared to classes with more instructor directiveness and more structure since such an atmosphere would be more congruent with their educational goals. It was expected that students with career and scholarship orientation will perform better in classes with more instructor directiveness and structure than in classes with student directiveness and less structure.

4. Scholastic aptitude. It was hypothesized that scholastic aptitude will relate positively to grades. Students with lower scholastic aptitude will perform better in classes with more instructor directiveness and more structure as compared to classes with more student directiveness and less structure. This was predicted because the lower aptitude individual may not be able to organize or direct his own ideas about learning a subject matter as well as the more capable student.

5. Self concept of academic ability. Self concept of academic ability has been found to be a good predictor of students' academic achievement even with college aptitude controlled (Biggs, 1970). Unpublished work at Corning Community College has also shown that grades are positively related to self concept of academic ability (Reimanis, 1970b).

It was predicted that students with low self concept of academic ability will perform better in small classes and with more structure and instructor directiveness than in large classes with student directiveness and less structure. The prediction was made on the assumption that in smaller classes students with low self concept will have better chance for their individual abilities to be recognized. Secondly, it was felt that more instructor direction and structure will require the students to rely less on their own direction which, it was assumed, would be more difficult to elicit in the low as compared to the high self concept student.

6. Aspiration-aptitude disparity in terms of under-and-over-aspirers. Baird (1969) has hypothesized that a large disparity between the aspirations of a student and his talents and resources leads to frustration and disappointment. The student may loose interest in course work, drop out, or simply become unhappy. In the present context it was predicted that students with large aptitude-aspiration disparity will perform better in smaller and more student directed classes as compared to larger and more instructor directed classes. It was assumed that such conditions will give the students more chance for discovery of the disparity and thus might protect them against becoming frustrated or bored.

Instructor characteristics:

1. Internal reinforcement control. It was hypothesized that instructor's internal reinforcement control will relate positively to student performance. It was assumed that an internally oriented instructor will provide more congruity in style for the internal control students. It was expected that external control students, especially in smaller classes, will learn from the internal control instructors to view the course with more feeling of internality.

2. Educational philosophy. This variable was considered under student characteristics. In general, more congruence in philosophy comparing students and faculty will lead to better performance.

3. Attitude toward teaching. It was hypothesized that an attitude expressing more concern for the student than the academic discipline will relate positively to performance. This relationship will be more pronounced in students whose philosophy of education centers on personal growth. These hypotheses were based on the assumption that today's students,especially in a college with an open-door admissions policy, seek personal reccgnition from the instructor; an instructor with more personal concern for students can satisfy such a need better.

Teaching Methods

1 and 2. Student versus instructor directiveness and class structure. Hypotheses under this category have been discussed under student characteristics.

3. Size of class. No overall relationship between the size of class and performance was predicted. Predictions involving interaction with the student variables were discussed under student characteristics. In general, student characteristics and instructor attitudes and philosophies were regarded as more important than the size of class within certain limits. No classes larger than 100 were included in the present study.

4. Student response system. It was hypothesized that use of a student response system whereby individual response can be elicited from students at any time during a class via electronic student response units, will yield better performance than a traditional lecture-discussion method. The effects will be more pronounced for the less capable, lower self concept of academic ability, and more career oriented students. The student response learning system involves greater structuring and more cueing for constant student feed-back. It was assumed that the more capable students will perform well under most conditions, however, the less capable and lower self concept of academic ability students will benefit from cueing to engage them in more active learning. The personal growth oriented students will benefit least under this system as compared to other students since such a method does not provide additional opportunities for relating course material to individual interests or life styles.

II METHOD

A total of 1034 students, 53 classes, and 27 faculty members participated in the study. The sample had 664 freshmen, 326 sophomores, 504 males and 505 females. Data from 561 students were collected during the fall semester and from 473 students during the spring semester. There were 19 male and 8 female instructors in the study representing 12 different courses in the areas of mathematics, biology, psychology, history, English, and drafting. The subject number will vary throughout the report since not all students and faculty completed all necessary materials, and in some instances data were collected from smaller subsamples. The total number of students contacted was 1884. The reason for the large attrition was that the instruments were administered to all students in a particular class. Some of the students in each class had dropped the course during the semester, and some had added the course. Only those subjects were used on whom relatively complete data were available at the beginning and at the end of a course. Another reason for different Ns is that in statistical analysis, such as correlations, it is required that each replication of observations be independent. Thus, students who served as subjects in several classes had to be eliminated from such overall analysis. The sample was drawn from the Corning Community College. The college, with an enrollment of about 2000, had an open-door admissions policy to all area high school graduates, The student sample drawn from such a population was expected to have wider ranges in student characteristics than most of past research undertaken to study teaching effectiveness. There was complete confidentiality of all data collected. The students were identified for matching purposes by their social security numbers.

The classes were selected on basis of preliminary data on the instructor and teaching method independent variables to assure a variety of types of methods and instructor characteristics for testing the hypotheses. With respect to class size the selection was rather obvious. With respect to other variables, such as structure of course, instructor style, and instructor's subject or student orientation, the preliminary selection was made on basis of a faculty questionnaire. On the questionnaire the instructors were requested to indicate their customary teaching procedure. That is, were their classes mostly instructor or student directed; did their classes have a definite structure that was adhered to throughout the course or did the rules and regulations change as the course progressed; and was the teaching primarily subject matter oriented or was there an important stress on direct relevance to student interests. The final determination on whether the class was structured or unstructured, student directed or instructor directed was made at the end of the semester on basis of student response with regard to these variables. It was felt that in a number of instances the instructor's own perception of his teaching style or the degree of structure in his class may not be accurate. Student's perceptions at the end of the course were regarded to be more relevant. Instructors in

this study were not assigned to randomly selected teaching methods. It was thought that the purpose of the study would be best served by permitting the instructors to conduct their courses in their accustomed manner. In such a way it would be possible to study the effects in a more natural setting. In order to change teaching techniques an intense training is necessary, otherwise a technique may be practiced in isolation and artificially.

Measuring Instruments

Dependent variable: Learning effectiveness

The dependent variable was assessed using eight different indices:

1. Interest in subject matter at the end of the course was assessed using five items developed for the present study. On these items the student responded by indicating agreement or disagreement on a five-point scale with items, such as "I am interested in taking another course in this subject", and "I enjoy reading material in this area on my own". Range of scores was 5 to 25.

2. Interest change was assessed by comparing students' responses on the interest scale at the beginning and at the end of the course. Ten points were added to each score to facilitate statistical analyses in cases of negative numbers.

3. Attitude toward a course subject matter at end of the course (last two weeks) was assessed using the Thurston-type uni-dimensional, seventeen item scale developed by Remmers (1960). The possible range of scores was from 0 to 16.

4. Attitude change toward a course subject matter. This variable was assessed by comparing the student's responses on the Remmer's scale at the beginning (first week) and at the end of the course. In order to facilitate statistical analyses in cases of negative values ten points were added to all attitude change scores.

5 and 6. Student's evaluation of course and instructor. These questionnaires were composites of items from various non-copyrighted sources and have been adapted to community college use in a previous pilot work (Reimanis, 1971a). The main format and the core items were taken from McKeachie's work (1969). The evaluation questionnaires were administered during the last two weeks of class. For instructor evaluation the range of scores was 17 to 85; for course evaluation the range was 10 to 50.

7. Perceived value of course in a six-month follow-up. To assess the perceived value of course in retrospect the item, "Was the experience of taking this course of personal value to you?", was used from the course evaluation questionnaire. The response on a five-point scale on this item was obtained through a mail questionnaire sent to all 561 students who participated in the study during the first semester. Three hundred and one students

returned the questionnaire. The range of scores was one to five.

Independent variables

Student characteristics:

1. Internal reinforcement control was assessed using Rotter's I-E scale (Rotter, 1966). The scale was scored in the direction of internality with a score range of 0 to 23.

2. Debilitating and facilitating anxiety were assessed using the Alpert-Haber scale (Haber, 1966). The range of scores for facilitating anxiety was 9 to 45, for debilitating anxiety the range was 10 to 50.

3. Educational philosophy was assessed using items from the college Experience questionnaire developed by the Project on Student Development in Small Colleges (Chickering, 1969). On this scale the students ranked four educational philosophies indicating which ones correspond closest to their own. The four philosophies, briefly defined, were: career orientation, cultivation of intellect, social development, and search for personal identity.

4. Scholastic aptitude was assessed using the standard Scholastic Aptitude Test developed by the Educational Testing Service.

5. Self concept of academic ability was assessed using a form developed by Biggs (1970) and adapted for community college students in previous work by the present author (Reimanis, 1970b).

6. Aspiration-aptitude disparity was assessed by comparing a student's scholastic aptitude with his educational aspirations. Students were divided into upper and lower half on basis of their aptitude scores. To determine aspiration level a scale of 1 to 5 was used to indicate aspirations from less than two years of college education to professional degrees. Students in the lower half on aptitude, having aspirations of four year college education or higher were identified as having high aptitude-aspiration disparity. Students in the lower half on aptitude having aspirations for two year education or less and students in upper half on aptitude having aspirations of four year college education or higher were identified as moderate aptitude-aspiration disparity groups. Students in upper half on aptitude, having aspirations of two year college education or less were identified as having low aptitude-aspiration disparity.

Data on indices 1, 2, 3 and 5 were obtained from students during the first week of classes. Biographical variables and data on indices 4 and 6 were obtained from college records.

Instructor variables:

1. Internal reinforcement control was assessed using the same measure as for students.

2. Educational philosophy was assessed in the same way as for students.

3. Attitude toward teaching. This instrument was adapted from a Thurston-type scale developed by Miller (In Shaw and Wright, 1964, p.71). Instructors expressed agreement or disagreement on a five-point scale with eighteen items that described the teaching profession, such as, "Teaching is one of the best means of serving humanity". Ten additional items were added to assess to what degree the instructors felt that subject matter orientation is most important in teaching, and to what degree they felt that student orientation is most important. For example, "In my course I cover the entire scope without changing it to suit the student's present interest", and "In class I am glad to discuss with students anything that they are interested in". The range of scores was 18 to 90, 5 to 25, and 5 to 25, respectively.

All of the instruments to assess instructors' characteristics were administered during the first week of classes.

Teaching methods

1. Student versus instructor directiveness was assessed using a questionnaire adapted for college students from the one used with high school students by Tuckman (1970). The students indicated on this scale the degree to which the instructor appeared to present his course using or not using student input and interests as important guiding factors. The range of scores was 11 - 99.

2. Structure of course. This questionnaire, consisting of nine items, was developed for the present study. The students were instructed to express agreement or disagreement with the items on a five-point scale to indicate to what degree the course had well defined rules governing various activities, such as class attendance, quizzes, class discussion, grading policy. The range of scores was 9 to 45.

3. Size of class. A small class was considered as one with less than 25 students. A large class was one with more than 65 students.

4. Student response system. In this method the instructor had at his disposal a system built by General Electric which consisted of a five multiple choice response unit at each student's desk, and an instructor's console which permitted immediate reading of student responses in percentages. The responses were also recordable on a tape for computor analysis. With the

identification of seat numbers, it was possible to analyze each student's responses on the tape throughout the course. A special mode of presentation taking advantage of the system had been worked out by a mathematics instructor. The method used many ideas from the programmed learning approach, except that in the present setting a larger number of students were involved in the process simultaneously.

III RESULTS AND DISCUSSION

Table 1 presents descriptive statistics on the student variables, and student ratings of class structure and student directiveness comparing results from the first and second semesters. As can be seen, the means and standard deviations were quite comparable. Thus, the data were combined for both semesters for most of the analyses.

Table 1

Descriptive Statistics of Variables Collected on Students During Fall and Spring Semesters

Variable	Fall Semester Mean	S.D.	N	Spring Semester Mean	S.D.	N
Internal control	12.90	4.06	528	12.12	4.46	423
Facilitating anxiety	23.27	5.52	534	23.49	5.34	425
Debilitating anxiety	29.51	6.46	534	29.06	6.51	425
Self concept of academic ability	27.77	5.06	533	27.02	4.83	425
Scholastic aptitude	893.72	156.50	226	922.12	164.83	192
Structure of course	30.68	6.12	556	31.27	5.29	471
Student directiveness	63.83	12.90	554	62.90	13.47	472
Interest in subject matter at end of course	14.57	4.55	551	14.69	4.86	465
Interest change (+10)	9.63	4.62	525	9.75	3.12	455
Attitude toward subject matter at end of course	10.16	2.69	556	10.04	2.46	471
Attitude change (+10)	9.61	2.54	537	9.67	2.24	463
Course evaluation	35.50	7.77	561	35.97	7.83	473
Instructor evaluation	69.52	11.01	561	66.19	12.92	473
Value of course six months later	3.55	1.32	301	-	-	-
Grade	3.75	0.99	556	3.55	1.08	471

It may be noted in the table that attitude and interest change values were less than 10 indicating that, on the average, attitudes and interests concerning the subject matter in a course decreased slightly during the semester. This may be partly due to the fact that data on these variables were collected during the first week of classes and not prior to actually coming in contact with the instructor. It is likely that during the first class sessions instructors attempt to arouse student interest more than it is possible during the ensuing sessions during a semester. Thus, actual increase in attitude or interest would be more unusual. The standard deviations, of course, indicate that almost a third of the students did increase on these variables.

Table 2 presents descriptive statistics on the eight dependent variables comparing freshmen and sophomores from first and second semester data. The significant ($p < .05$) t-values comparing the means of freshmen and sophomores for each semester indicate that sophomores, as might be expected, experienced more learning effectiveness than freshmen.

Table 3 presents intercorrelations between the eight dependent variables. All of the correlations were significant beyond the .01 level and twenty from the twenty-eight correlations were above .3. Thus, it can be assumed that all eight variables shared some common variance in assessing teaching effectiveness. The observation that the correlations between instructor evaluation, course evaluation, and course evaluation in a six month follow-up were +.50 or higher suggests that these measures had at least a moderate reliability. The finding that the grade received in a course correlated only +.23 and +.13 with course and instructor evaluation, respectively, indicated that the latter two variables were not influenced to a great extent by the grade that one was receiving in a course. Attitude and interest change, on the other hand, while having low (+.14 and +.13) correlations with grades, had substantially higher correlations with course and instructor evaluation. This finding suggests further that the feelings or interests that one has with regard to a course subject matter were not primarily determined by the grade one hoped to receive. On the other hand, course and instructor evaluation were, probably, influenced by students' interest and attitude change.

Student internal reinforcement control

The first hypothesis, stating that a student's internal control is related positively to learning effectiveness, was partly supported. Table 4 presents the mean value comparisons for the eight dependent variables after the students were divided into upper, middle, and lower thirds on basis of their locus of control scores. The mean internal score was 12.55 (N=951). The ranges of scores for the three groups were: 1 - 10, 11 - 14, and 15 - 23 for the low, middle, and high internal control groups. From Table 4 it can be seen that the largest number of significant t-values comparing the dependent

Table 2
Mean Value Comparisons on the Eight Dependent Variables Between
Fall and Spring Semester Freshmen and Sophomores

Variable	Fall Semester					Spring Semester				
	Freshmen			Sophomore		Freshmen			Sophomore	
	M	N	t	M	N	M	N	t	M	N
Interest in subject matter at end of course	14.61	330	0.21	14.52	189	14.66	293	0.16	14.74	131
Interest change (+10)	9.42	313	0.73	9.66	181	9.73	285	1.16	10.12	129
Attitude toward subject matter at end of course	10.08	331	0.34	10.15	194	9.80	299	2.61*	10.47	130
Attitude change (+10)	9.51	320	0.26	9.56	190	9.53	294	2.36*	10.09	128
Course evaluation	34.57	334	3.55*	37.03	195	35.21	300	3.14*	37.73	131
Instructor evaluation	68.16	334	4.06*	72.03	195	65.77	300	0.50	66.45	131
Value of course six months later	3.46	181	1.22	3.67	99	-	-	-	-	-
Grade	3.61	331	3.88*	3.96	194	3.52	298	1.95	3.74	131

* $p < .05$

Table 3

Pearson Product-Moment Correlation Coefficients
Among the Eight Dependent Variables

Variable	1	2	3	4	5	6	7	8
1. Interest toward subject matter at end of course		+.50	+.58	+.26	+.51	+.30	+.49	+.21
2. Interest Change (+10)			+.32	+.35	+.32	+.23	+.33	+.14
3. Attitude toward subject matter at end of course				+.66	+.61	+.49	+.55	+.25
4. Attitude change (+10)					+.41	+.34	+.38	+.13
5. Course evaluation						+.66	+.52	+.23
6. Instructor evaluation							+.52	+.13
7. Value of course six months later								+.27
8. Grade								

Note: All correlations were significant beyond the .05 level. All Ns were larger than 850 except in correlations with value of course 6 months later where Ns were between 256 and 279.

Table 4

Comparisons on Dependent Variables Between
High, Middle, and Low Internal Control Student Groups

Variables	High M	High N	High t	Middle M	Middle N	Middle t	Low M	Low N	High vs. Low t
Interest toward subject matter at end of course	15.00	315	1.36	14.51	321	1.45	13.98	297	2.67*
Interest change (+10)	9.57	304	0.38	9.46	312	1.42	9.85	283	1.06
Attitude toward subject matter at end of course	10.36	317	1.26	10.16	322	2.42*	9.71	305	3.49*
Attitude change (+10)	9.69	307	0.30	9.65	313	0.27	9.59	297	0.50
Course evaluation	37.56	318	3.49*	35.54	326	2.62*	33.93	307	5.85*
Instructor evaluation	70.83	318	3.04*	68.11	326	3.18*	65.07	307	6.01*
Value of course six months later	3.81	89	1.93	3.46	106	0.93	3.28	86	2.53*
Grade	3.69	313	0.30	3.71	325	0.89	3.64	306	0.60

* $p < .05$

variables was between the high and low internal groups. In none of the comparisons were the mean grade difference significant. In the same way, when a correlation coefficient was computed between locus of control and grades the result was not significant (r=+.01, N = 833). This lack of significance was in line with earlier findings by Crandall (1969), and Reimanis (1970a). It appears that the actual achievement in a course may not be influenced by locus of control. However, other dependent variables that were assumed to be more meaningful in a community college setting, were related positively to one's feeling that he has control over what happens to him.

The second hypothesis dealing with locus of control, stating that high internal control students will perform better in classes where they perceive more structure as compared to middle and low internal control students, was partly supported. High and low structure was determined by subdividing all students into upper and lower half on basis of their class structure ratings. Students' own perceptions were used to subdivide them into high and low structure groups. Whole classes were not assigned to high or low structure groups on basis of mean structure ratings or by other methods since the mean structure ratings did not differ a great deal from class to class. The means ranged from 26.03 to 35.92, and the standard deviations ranged from 2.59 to 10.46. By using a cutting point to sudivide whole classes, in most instances there would be 30 to 50 percent overlap of individual scores. When whole classes were assigned to high or low structure groups for comparison purposes, similar findings, indicating significantly more learning effectiveness for higher structured classes was present (see Table 6). Thus, it was felt that a student's own perception of the degree of structure in a class was more important in the present context than the perception by the majority of his peers.

As can be seen in Table 5, all three groups showed better learning effectivness in classes where more structure was perceived. However, only for the high internal control students the grade was also significantly higher in the group perceiving high structure as compared to low structure.

The observation that grades had non-signficant correlations with both locus of control (r = +.01, N = 833) and structure of class (r = +.02, N = 886), implies further that it was not structure by itself, but rather a combination of high internal control and high structure that gave rise to higher grades. Perception of class structure and locus of control had a correlation of +.14 (N = 833), suggesting that high internal control students perceived slightly but significantly more structure in their classes as compared with low internal control students. It will be recalled that locus of control was assessed at the beginning of the course whereas structure of class was assessed about four months later at the end of the course. The present author also has shown in previous work that locus of control is a fairly stable variable in college students who are not subjected to special treatments

Table 5
Comparisons on Dependent Variables Between High and Low Class Structure Groups for each of the High, Middle, and Low Internal Control Categories

Variable	Low Internal Control					Middle Internal Control					High Internal Control				
	Structure					Structure					Structure				
	High			Low		High			Low		High			Low	
	M	N	t	M	N	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	14.20	134	0.73	13.79	162	14.88	155	1.69	14.07	164	15.23	178	1.02	14.69	136
Interest change (+10)	10.20	128	1.64	9.56	154	10.12	150	3.49*	8.83	160	9.86	173	1.86	9.17	130
Attitude toward subject matter at end of course	10.09	138	2.37*	9.40	166	10.46	155	2.69*	9.86	165	10.78	178	4.39*	9.80	138
Attitude change (+10)	9.86	134	1.51	9.39	162	10.02	148	3.44*	9.31	163	10.15	170	4.51*	9.13	136
Course evaluation	30.29	138	4.71*	32.02	168	37.28	156	4.36*	33.82	167	39.56	179	5.83*	34.94	138
Instructor evaluation	70.07	138	6.71*	60.97	168	71.99	156	6.35*	64.38	167	74.24	138	6.42*	66.45	138
Value of course six months later	3.77	35	2.61*	2.94	51	3.75	79	2.34*	3.20	56	3.90	48	0.70	3.71	41
Grade	3.65	138	0.29	3.62	167	3.74	155	0.52	3.68	167	3.82	174	2.57*	3.52	138

* $p < .05$

Table 6

Comparisons on Dependent Variables Between Classes Having High and Low Structure

Variable	High Structure M	N	t	Low Structure M	N
Interest toward subject matter at end of course	14.02	367	2.75*	14.91	508
Interest change (+10)	10.28	347	4.60*	9.23	495
Attitude toward subject matter at end of course	10.20	373	2.04*	9.88	512
Attitude change (+10)	9.95	354	4.32*	9.30	505
Course evaluation	37.59	373	7.01*	33.93	517
Instructor evaluation	72.68	373	11.57*	63.77	517
Value of course six months later	3.76	87	2.30*	3.35	157
Grade	3.74	370	1.93	3.60	516

* $p < .05$

(Reimanis, 1971b). Thus, it seems certain that the grade, internal control, and perceived structure of course interrelationship was not due to the possibility that all three measures could have been influenced by the same factors that occurred during the course.

Debilitating anxiety

The present data on facilitating - debilitating anxiety supported previous findings by Desiderato and Koskinen (1969) in that low, but significant ($p < .01$) correlations were obtained between the anxiety variables and grades (facilitating: $r = +.12$, debilitating: $r = -.16$, Ns = 842). The results were in line with Lin and McKeachie's (1970) explanation that the grade -- anxiety relationship could be largely accounted for by differences in abilities which relate to anxiety and study habits. In the present study the correlations between scholastic aptitude scores and facilitating, and debilitating anxiety were +.12 and -.22, respectively (Ns = 324).

The hypothesis that students high on debilitating anxiety will perform better in structured classes than in unstructured as compared with other students, was supported only indirectly by the present data. The students were assigned to high and low debilitating anxiety groups on basis of above or below median scores. In Table 7 it can be seen from the significant t-values that learning effectiveness, as defined by the eight variables, was, in general, better for students rating their classes higher on structure than those rating them lower. In the table it can also be seen that the lowest scores on all eight variables were for the high debilitating anxiety group perceiving low class structure. The means for the high debilitating anxiety groups perceiving high class structure were not as different from the low debilitating group perceiving high class structure. Comparing the means for these latter two groups, only the means for grades were significantly different ($t = 3.00$, $p < .01$). Class structure had significant correlations with neither facilitating nor debilitating anxiety ($rs = +.03, -.04$, Ns = 842). Thus, the results suggest a trend that, even though high class structure lead to better learning effectiveness in most students, the effect seemed to be more pronounced for those with high debilitating anxiety. In Table 8 it can be seen that higher learning effectiveness was attained, as expected, by students low on debilitating anxiety as compared with those scoring higher on this variable.

The second hypothesis regarding debilitating anxiety was not supported by the present results. As can be seen in Table 9, for both low and high debilitating anxiety students significantly better learning effectiveness was present in classes where they perceived more student directiveness as opposed to instructor directiveness. For the same reasons as in determining low and high class structure, student or instructor directiveness was determined for each student on basis of his own perception. Perception of

Table 7

Comparisons On Dependent Variables Between High and Low Class Structure Groups for High and Low Debilitating Anxiety Students

	Debilitating Anxiety									
	High					Low				
	Structure					Structure				
	High			Low		High			Low	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	14.67	249	1.75	13.95	256	14.99	220	1.05	14.53	212
Interest change (+10)	10.19	237	3.79*	9.01	248	9.80	216	1.16	9.46	202
Attitude toward subject matter at end of course	10.40	250	4.59*	9.45	258	10.55	223	2.89*	10.00	217
Attitude change (+10)	10.09	236	3.91*	9.27	254	9.93	218	3.07*	9.33	213
Course evaluation	37.27	250	7.40*	32.30	260	38.51	225	5.08*	35.09	219
Instructor evaluation	70.96	250	8.03*	62.62	260	73.67	225	8.31*	65.44	219
Value of course six months later	3.78	78	2.14*	3.34	89	3.85	55	2.79*	3.18	61
Grade	3.60	248	1.26	3.49	259	3.87	221	1.20	3.76	219

* $p < .05$

Table 8

Comparisons on Dependent Variables Between High and Low Debilitating Anxiety Students

Variables	High M	High N	t	Low M	Low N
Interest toward subject matter at end of course	14.20	442	2.08*	14.83	499
Interest change (+10)	9.58	422	0.26	9.64	485
Attitude toward subject matter at end of course	9.89	444	2.57*	10.26	508
Attitude change(+10)	9.67	427	0.33	9.63	498
Course evaluation	34.50	447	4.64*	36.79	512
Instructor evaluation	66.38	447	4.14*	69.55	512
Value of course six months later	3.53	147	0.03	3.53	137
Grade	3.54	444	3.64*	3.79	508

*$p < .05$

student directiveness was defined as having a score above the median, and instructor directiveness was defined as having a score below the median. It will be quite evident from the data presented thus far and in later sections of this report that a teaching method which was student directed was in general superior to that which was primarily instructor directed. It should be recalled, however, that class structure was also an important variable contributing to effective learning. Thus, by "student directed" in effective teaching, it is not implied that the class activities should be left entirely to the students, but that student input should be used in arriving at a structure for the course, and that students should feel that their inputs and interests are considered throughout the course.

Table 9

Comparisons on Dependent Variables Between Student and Instructor Directiveness Groups for High and Low Debilitating Anxiety Groups

	High Debilitating Anxiety				
	Student Directiveness			Instructor Directiveness	
Variables	M	N	t	M	N
Interest toward subject matter at end of course	15.50	245	5.34*	13.34	258
Interest change (+10)	9.81	235	1.38	9.38	251
Attitude toward subject matter at end of course	10.56	246	6.01*	9.34	260
Attitude change (+10)	98.88	236	1.97	9.47	254
Course evaluation	36.60	248	4.99*	33.16	261
Instructor evaluation	70.07	248	5.97*	63.79	261
Value of course six months later	3.85	80	2.58*	3.33	86
Grade	3.74	247	4.04*	3.37	259

	Low Debilitating Anxiety				
	Student Directiveness			Instructor Directiveness	
Variables	M	N	t	M	N
Interest toward subject matter at end of course	15.60	240	4.19*	13.78	191
Interest change (+10)	9.81	237	1.37	9.41	180
Attitude toward subject matter at end of course	10.70	244	4.96*	9.75	195
Attitude change (+10)	9.72	239	0.98	9.52	191
Course evaluation	38.39	246	5.24*	34.84	197
Instructor evaluation	72.71	246	6.08*	65.62	197

Table 9 continued.....

Table 9 continued

	Low Debilitating Anxiety				
	Student Directiveness			Instructor Directiveness	
Variables	M	N	t	M	N
Value of course six months later	3.70	61	1.76	3.27	55
Grade	3.96	245	3.48*	3.63	195

*$p < .05$

Table 10 presents mean comparisons between student and instructor directed classes. That is, when whole classes were assigned to either high or low group on basis of mean student directiveness scores. As can be seen, the same highly significant trend in favor of student directiveness was present.

Table 10

Comparisons on Dependent Variables Between Classes Having Student and Instructor Directiveness

	Directiveness				
	Student directed Classes			Instructor directed Classes	
Variable	M	N	t	M	N
Interest in subject matter at end of course	15.53	518	6.58*	13.57	457
Interest change (+10)	9.72	499	1.11	9.48	442
Attitude toward subject matter at end of course	10.40	523	5.54*	9.60	463
Attitude change (+10)	9.68	506	1.31	9.49	453
Course evaluation	36.27	528	2.12*	35.22	465
Instructor evaluation	68.85	528	2.51*	66.94	465
Value of course six months later	3.57	167	1.08	3.39	112
Grade	3.84	523	5.95*	3.45	463

*$p < .05$

Philosophy of Education

There were no significant mean differences between the dependent variables when those students whose educational philosophy matched the instructor's philosophy were compared with those where the philosophies differed. Thus, the hypothesis that the students will perform better in situations where their philosophies match the instructor's was not supported.

A second analysis was performed where student and faculty philosophies 1 and 2 (career, intellect orientation) were grouped together. The same analysis was made by grouping philosophies 3 and 4 (social development, personal identity). Again, no significant differences between the dependent variables were observed, except that the unmatched students with philosophies 1 and 2 had significantly ($p<.05$) higher grades than the matched students with philosophies 3 and 4. ($M_{1,2} = 3.85$, $N_{1,2} = 250$; $M_{3,4} = 3.64$, $N_{3,4} = 242$; $t = 2.30$). It became apparent that the career and intellect oriented students in general had higher grades. There was a significant mean grade difference comparing the unmatched students having philosophies 1 and 2 with those having philosophies 3 and 4. ($M_{1,2} = 3.85$, $N_{1,2} = 250$; $M_{3,4} = 3.57$, $N_{3,4} = 151$; $t = 2.77$). This finding supported earlier research (Reimanis, 1971c) which suggested that career and intellect oriented students spent more time studying and being concerned about grades than social development or personal identity oriented students.

In the present study there were no significant correlations between scholastic aptitude and students' philosophy of education ($rs = -.11, +.11, -.06, +.05$; $Ns = 302 - 308$ for philosophies 1, 2, 3, 4, respectively). When data were analyzed subdividing the classes on basis of instructor's philosophy of education, the only significant mean difference was between instructor evaluations. For instructors having philosophy 1 or 2 as compared with 3 or 4 the means were 66.84 and 68.87 with Ns of 453 and 557, respectively ($t = 2.70$, $p < .01$). This indicated that instructors with more social and identity philosophies were evaluated somewhat better than those with career or intellect oriented philosophies.

The hypothesis that students with social development or personal identity philosophies will do better in classes where they perceive less structure and less instructor directiveness were not supported. As can be seen in Tables 11 and 12, all students showed significantly better learning effectiveness, on at least five of the eight dependent variables, with more structure and more student directiveness. Neither class structure nor student directiveness correlated significantly with student's philosophy of education. All rs were less than .1 with Ns between 754 and 768. The important effects of class structure and student directiveness on the dependent variables did not appear to be different comparing the various philosophy of education groups These findings again support the significance of class structure and student directiveness in teaching effectiveness.

Table 11
Comparison On Dependent Variables
Between High and Low Class Structure Groups
For Career and Intellect, and Social Development and Personal Identity
Oriented Students

Variables	Career and Intellect Structure					Social Development and Personal Identity Structure				
	High			Low		High			Low	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	15.11	273	1.95	14.29	199	14.86	189	1.294	14.24	194
Interest change (+10)	9.99	264	2.93*	9.08	192	9.95	181	2.46*	9.12	184
Attitude toward subject matter at end of course	10.48	277	4.40*	9.62	201	10.53	191	2.89*	9.88	196
Attitude change (+10)	9.90	271	3.34*	9.24	200	10.12	178	3.25*	9.38	192
Course evaluation	37.81	279	6.15*	33.70	203	37.76	191	5.38*	33.59	198
Instructor evaluation	71.41	279	6.84*	64.67	203	72.60	191	7.67*	63.71	198
Value of course six months later	3.79	87	2.36*	3.34	82	3.74	51	1.31	3.37	52
Grade	3.81	273	0.51	3.76	203	3.67	191	1.32	3.53	197

* $p < .05$

Table 12

Comparison on Dependent Variables Between
Student and Instructor Directiveness Groups For Career and Intellect,
and Social Development and Personal Identity Oriented Students

	Career and Intellect					Social Development and Personal Identity				
	Student Directed			Instructor Directed		Student Directed			Instructor Directed	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	15.61	234	3.91*	14.00	236	15.65	212	4.77*	13.43	171
Interest change (+10)	9.91	228	1.93	9.31	226	9.60	205	0.45	9.45	163
Attitude toward subject matter at end of course	10.61	238	4.99*	9.64	238	10.78	212	5.75*	9.55	175
Attitude change (+10)	9.73	235	1.07	9.51	234	9.95	201	2.00*	9.50	171
Course evaluation	37.94	239	5.59*	34.21	241	37.52	215	5.02*	33.62	175
Instructor evaluation	72.50	239	8.20*	64.68	241	71.66	215	6.64*	63.90	175
Value of course six months later	3.87	77	2.76*	3.34	93	3.83	60	1.91	3.29	42
Grade	3.92	237	2.99*	3.65	238	3.83	215	4.63*	3.36	174

*$p < .05$

Scholastic aptitude

The hypothesis that scholastic aptitude will relate to grades was supported. When the students were subdivided into high and low aptitude groups on basis of median scholastic aptitude after both verbal and mathematics scores were combined (low = 422 - 890; high = 897 - 1592), the grade difference was significant, as can be seen in Table 13. There were no significant differences, however, comparing the students on other dependent variables. The correlation coefficient for the entire sample between scholastic aptitude and grades was +.24 ($p < .01$).

Table 13

Comparison On Dependent Variables
Between High and Low Scholastic Aptitude Students

Variables	High M	N	t	Low M	N
Interest toward subject matter at end of course	14.62	219	0.77	14.27	194
Interest change (+10)	9.53	214	0.98	9.21	185
Attitude toward subject matter at end of course	9.81	220	0.26	9.87	194
Attitude change (+10)	9.38	212	0.11	9.41	188
Course evaluation	35.03	221	0.65	34.53	197
Instructor evaluation	66.75	221	0.11	66.62	197
Value of course six months later	3.22	67	0.57	3.36	66
Grade	3.80	221	4.21*	3.40	194

*$p < .05$

The hypotheses that students lower on scholastic aptitude will perform better in classes where they perceive more instructor directiveness and structure as compared to other students were not supported. As can be seen in Tables 14 and 15, again there was outstanding evidence that for all students teaching effectiveness was higher with more structure and student directiveness. Furthermore, in both Tables 14 and 15 it can be seen that the mean values for all dependent variables, except grade, in the low aptitude, high structure, and in the low aptitude, high student directiveness groups were slightly higher than for the high aptitude groups in the low structure and instructor directiveness categories. This suggests that in the present study student directiveness and class structure were more important contributors to learning effectiveness than scholastic aptitude.

Table 14
Comparison On Dependent Variables Between High and Low Class Structure Groups for High and Low Scholastic Aptitude Groups

	High SAT					Low SAT				
	High Structure			Low Structure		High Structure			Low Structure	
Variables	M	N	t	M	N	M	N	t	M	N
Interest in subject matter at end of course	14.77	82	0.55	14.39	133	14.57	107	1.05	13.93	88
Interest change (+10)	10.26	80	2.72*	9.04	130	9.29	103	0.26	9.17	83
Attitude toward subject matter at end of course	9.93	82	0.56	9.72	135	10.51	108	4.66*	9.10	87
Attitude change (+10)	9.93	79	2.71*	9.03	130	10.11	102	4.87*	8.62	87
Course evaluation	37.35	82	3.51*	33.52	135	36.46	109	4.12*	32.15	89
Instructor evaluation	71.80	82	5.00*	63.56	135	70.40	109	5.20*	62.02	89
Value of course six months later	3.70	23	2.15*	2.90	42	3.54	37	1.20	3.14	29
Grade	3.87	82	0.82	3.76	135	3.58	106	2.82*	3.19	89

*$p < .05$

Table 15

Comparison On Dependent Variables
Between Student and Instructor Directiveness Groups
For High and Low Scholastic Ability Students

Variables	High SAT					Low SAT				
	Student Directed			Instructor Directed		Student Directed			Instructor Directed	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	16.01	115	4.57*	13.09	102	14.76	98	1.39	13.91	93
Interest change (+10)	9.94	113	2.16*	8.99	99	9.43	95	0.97	8.97	88
Attitude toward subject matter at end of course	10.64	115	5.29*	8.87	103	10.34	100	3.01*	9.41	91
Attitude change (+10)	9.66	111	1.88	9.05	99	9.70	96	1.73	9.15	89
Course evaluation	37.67	116	5.48*	32.09	103	35.77	100	2.32*	33.28	94
Instructor evaluation	71.51	116	6.70*	61.28	103	69.28	100	3.26*	63.90	94
Value of course six months later	3.56	36	2.06*	2.84	31	3.59	32	1.16	3.21	33
Grade	4.03	116	3.84*	3.54	103	3.56	100	2.08*	3.27	91

*$p < .05$

Self concept of academic ability

Tables 16, 17, and 18 present results on student self concept of academic ability. Low and high self concept students were defined as those falling above and below the median on the self concept of academic ability scale. This scale was scored in such a way that the lower the score the higher the self concept. The self concept had a correlation of -.25 (N = 872) with grades and -.32 (N = 323) with scholastic aptitude. From Tables 16, 17, and 18 it can be seen that, in general, the higher self concept students showed more learning effectiveness. This finding supported earlier research by Biggs (1970) and Reimanis (1970b).

The hypothesis that low self concept students will perform better in small classes as compared to large classes was not supported. A small class was defined as one having 26 students or less, and a large class had 65 students or more. It can be seen from Table 16, that class size had no significant ($p < .05$) relationships to learning effectiveness. The two t-values that reached the .10 significance level for the low self concept group in comparing mean instructor and course evaluations suggests a trend in favor of the smaller class. Comparing the mean values of the dependent variables between high and low self concept groups, it is quite evident that self concept is more important in determining learning effectiveness than class size. t-values were significant ($p < .01$) for interest at end of course, course evaluation, instructor evaluation, and grade (ts = 3.30, 3.65, 2.59, and 3.79, respectively) when these were computed comparing the large class, low self concept and large class high self concept groups.

In the same way as with previous hypotheses involving class structure or student directiveness interaction with other variables, the ones regarding self concept of academic ability were not supported. All groups performed better with more structure and student directiveness. (See Tables 17 and 18). In Table 17 it is interesting to note that six of the mean values were higher for the high structure low self concept group than for the low structure, high self concept group. This again suggests that in the same way as with aptitude, class structure may be a more important contributor to learning effectiveness than self concept of academic ability.

The same discussion seems to apply to the interaction between self concept and student directiveness. In this case, as can be seen in Table 18, seven of the eight dependent variables were higher for the low self concept, student directiveness group than for the high self concept, teacher directiveness group.

Table 16

Comparison On Dependent Variables
Between Students in Large Classes and Small Classes
For Students High and Low on Self Concept of Academic Ability

	High Self concept of academic ability					Low self concept of academic ability				
	Large class			Small class		Large class			Small class	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	15.05	237	1.33	14.30	103	13.56	201	0.83	14.06	78
Interest change (+10)	9.56	231	0.60	9.79	101	9.18	192	0.97	9.64	73
Attitude toward subject matter at end of course	10.25	235	0.43	10.14	107	9.74	205	0.01	9.74	80
Attitude change (+10)	9.64	228	0.04	9.64	107	9.46	199	0.20	9.53	79
Course evaluation	35.77	239	0.19	35.93	107	33.13	208	1.90	35.04	80
Instructor evaluation	67.92	239	1.59	70.06	107	64.78	208	1.92	67.99	80
Value of course six months later	3.56	68	0.10	3.59	41	3.15	66	0.28	3.24	25
Grade	3.89	238	1.00	3.78	107	3.50	207	1.25	3.32	76

*$p < .05$

Table 17

Comparisons On Dependent Variables
Between High and Low Class Structure Groups
For Students High and Low On Self Concept of Academic Ability

	High Self concept of academic ability Structure					Low Self concept of academic ability Structure				
	High			Low		High			Low	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	15.14	252	1.16	14.65	248	14.48	217	1.84	13.70	219
Interest change (+10)	10.03	247	2.23*	9.39	241	10.02	206	2.97*	9.02	207
Attitude toward subject matter at end of course	10.55	253	3.22*	9.93	251	10.37	220	4.26*	9.47	223
Attitude change (+10)	9.97	246	3.43*	9.34	247	10.06	208	3.60*	9.26	219
Course evaluation	38.15	255	5.04*	34.83	252	37.59	220	7.91*	32.08	226
Instructor evaluation	72.83	255	7.71*	65.29	252	71.76	220	8.77*	62.30	226
Value of course six months later	4.03	61	3.27*	3.31	81	3.62	72	1.62	3.26	68
Grade	3.87	254	0.48	3.83	251	3.57	215	1.91	3.38	226

*$p < .05$

Table 18

Comparisons On Dependent Variables
Between Student and Instructor Directiveness Groups
For Students High and Low On Self Concept of Academic Ability

Variables	High self concept of academic ability: Student Directed M	N	t	Instructor Directed M	N	Low self concept of academic ability: Student Directed M	N	t	Instructor Directed M	N
Interest toward subject matter at end of course	15.98	263	5.10*	13.86	237	14.98	227	4.40*	13.13	210
Interest change (+10)	9.90	261	1.38	9.51	229	9.73	215	1.26	9.30	199
Attitude toward subject at end of course	10.67	265	4.62*	9.79	238	10.56	230	6.46*	9.26	215
Attitude change (+10)	9.70	260	0.48	9.61	234	9.90	220	2.29*	9.39	209
Course evaluation	38.21	267	5.26*	34.75	240	36.65	232	5.34*	32.80	216
Instructor evaluation	72.54	267	7.49*	65.19	240	70.01	232	5.57*	63.74	216
Value of course six months later	3.92	73	2.60*	3.35	69	3.61	69	1.40	3.30	71
Grade	4.01	266	3.84*	3.68	239	3.65	230	3.74*	3.28	213

*$p < .05$

Aptitude-aspiration disparity

The results in Table 19 offered some support for the hypothesis that high aptitude-aspiration disparity students do better in student directed classes than in instructor directed as compared to low disparity students. It can be seen that for the low aptitude, high aspiration group there were more significant mean differences between the dependent variables than for the low aptitude, low aspiration group. There were no significant mean differences between the high and low aspiration groups when aptitude and student directiveness were controlled. That is, no t-values were significant in comparing the two student directiveness groups with each other and the two instructor directiveness groups in Table 19.

Table 20 presents results comparing the high aptitude, low and high aspiration groups on student directiveness. As can be seen in both high and low aspiration groups, students perceiving student directiveness performed better than those perceiving instructor directiveness. When high and low aspiration groups were compared, as seen in this table, there was some tendency for the high aspiration groups to show better learning effectiveness. t-values, however, were significant only for two variables. Attitude change was significantly higher for the high aspiration, instructor directiveness group as compared to the low aspiration, instructor directiveness group ($t = 2.00$). The other significant t-value was in the opposite direction for the student directiveness group. That is, the low aspiration student directiveness group had a higher mean grade as compared to the high aspiration groups ($t = 2.05$). The present data offer no explanation why from high aptitude students perceiving student directiveness in their classes the ones with lower aspiration received higher grades than those with high aspirations.

A similar comparison was made between the disparity groups on basis of perceived class structure. The results are presented in Tables 21 and 22. From these tables it can be seen that in general all high class structure groups performed better than low structure. For the high aptitude groups, however, significant t-values were obtained only for the high aspiration groups when comparisons were made on the dependent variables between high structure and low structure groups. In comparing the aspiration groups in Table 21 with aptitude and structure held constant, the only significant mean difference was on attitude change with the high aptitude, low aspiration, low structure group scoring lower than the high aptitude, high aspiration, low structure group ($t=2.45$). The hypothesis regarding class size and aptitude-aspiration disparity was not supported. That is, the low aptitude, high aspiration group did not perform better in smaller than in larger classes. Actually the trend was in the opposite direction. As can be seen in Tables 23 and 24, only the low aptitude, low aspiration group performed better in small classes. For the other groups the significant mean differences were in favor of the large classes. These findings are difficult to explain. Because

Table 19

Comparisons On Dependent Variables
Between Student and Instructor Directiveness Groups
For Low Aptitude, High and Low Aspiration Groups.

Variables	Low SAT - High Aspiration					Low SAT - Low Aspiration				
	Student Directed			Instructor Directed		Student Directed			Instructor Directed	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	14.40	42	0.15	14.25	36	14.86	35	0.63	14.16	25
Interest change (+10)	9.28	39	0.54	8.85	34	8.97	35	0.85	9.64	25
Attitude toward subject matter at end of course	10.41	43	2.27*	9.29	34	10.08	37	0.61	9.70	24
Attitude change (+10)	9.68	38	1.05	9.15	33	9.54	36	0.20	9.42	25
Course evaluation	37.00	43	2.41*	32.89	36	34.92	37	0.19	35.32	25
Instructor evaluation	70.65	43	2.87*	63.44	36	66.49	37	0.06	66.68	25
Value of course six months later	3.67	12	1.05	3.08	13	3.75	8	0.82	3.25	8
Grade	3.46	43	1.13	3.26	35	3.73	37	1.08	3.43	23

* $p < .05$

Table 20

Comparisons On Dependent Variables
Between Student and Instructor Directed Groups For
High Aptitude Students, with High and Low Aspirations

Variables	High SAT - Low Aspirations					High SAT - High Aspirations				
	Student Directed			Instructor Directed		Student Directed			Instructor Directed	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	14.91	22	1.73	12.38	29	16.54	66	3.16*	13.80	51
Interest change (+10)	10.09	22	1.77	8.50	28	10.08	64	1.16	9.36	50
Attitude toward subject matter at end of course	10.46	23	2.74*	8.22	30	11.00	65	4.64*	9.05	51
Attitude change (+10)	9.59	23	1.84	8.22	30	9.94	62	1.00	9.56	48
Course evaluation	38.13	23	2.60*	32.43	30	38.47	66	4.28*	32.61	51
Instructor evaluation	68.96	23	1.83	63.30	30	72.44	66	5.81*	59.69	51
Value of course six months later	2.50	6	0.47	3.00	6	3.59	22	1.58	2.93	15
Grade	4.35	23	3.89*	3.23	30	3.95	66	1.85	3.67	51

*$p < .05$

Table 21
Comparisons on Dependent Variables
Between High and Low Class Structure Groups
For Students High on Scholastic Aptitude With High and Low Aspirations

	High SAT - Low Aspiration Structure					High SAT - High Aspiration Structure				
	High			Low		High			Low	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	13.60	20	0.14	13.39	31	15.77	44	0.95	14.90	72
Interest change (+10)	9.35	20	0.27	9.10	30	10.60	42	2.05*	9.30	71
Attitude toward subject matter at end of course	9.22	20	0.07	9.17	33	10.30	44	0.47	10.08	72
Attitude change (+10)	9.48	20	1.38	8.41	33	10.15	41	1.39	9.60	69
Course evaluation	36.35	20	0.98	34.03	33	38.89	44	3.52*	33.85	72
Instructor evaluation	68.95	20	1.61	63.82	33	73.34	44	4.44*	62.82	72
Value of course six months later	3.33	3	0.64	2.56	9	3.73	15	1.74	3.00	21
Grade	3.80	20	0.40	3.67	33	3.91	44	0.96	3.75	72

*$p < .05$

Table 22

Comparisons on Dependent Variables
Between High and Low Class Structure Groups
For Students Low on Scholastic Aptitude With High and Low Aspirations

Variables	Low SAT - High Aspirations Structure					Low SAT - Low Aspirations Structure				
	High			Low		High			Low	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	14.93	43	1.33	13.60	35	14.97	34	1.08	13.79	28
Interest change (+10)	9.55	40	1.32	8.52	33	9.00	34	0.82	9.63	27
Attitude toward subject matter at end of course	10.72	43	3.96*	8.90	34	10.56	35	2.63*	8.98	28
Attitude change (+10)	10.43	38	4.89*	8.29	33	10.06	34	2.43*	8.66	29
Course evaluation	37.41	44	3.09*	32.26	35	37.00	35	2.33*	32.38	29
Instructor evaluation	71.61	44	3.97*	62.03	35	69.86	35	2.63*	61.62	29
Value of course six months later	3.69	16	1.60	2.78	9	3.20	10	0.56	3.57	7
Grade	3.53	43	2.02*	3.17	35	3.76	33	1.45	3.38	29

*$p < .05$

Table 23

Comparisons On Dependent Variables
Between Large and Small Classes For Low Scholastic Aptitude Students
With High and Low Aspirations

Variables	Low SAT - High Aspirations					Low SAT - Low Aspirations				
	Large Class M	N	t	Small Class M	N	Large Class M	N	t	Small Class M	N
Interest toward subject matter at end of course	14.64	42	0.92	13.50	18	13.50	24	1.85	15.79	19
Interest change (+10)	9.18	39	0.90	8.28	18	9.56	23	0.05	9.52	19
Attitude toward subject matter at end of course	10.37	41	2.92*	8.61	18	9.94	24	0.05	9.90	20
Attitude change (+10)	9.66	37	1.84	8.47	18	9.34	25	0.95	9.93	20
Course evaluation	36.07	43	2.79*	30.33	18	32.56	25	2.94*	38.70	20
Instructor evaluation	69.39	43	2.47*	61.39	18	63.32	25	2.49*	71.45	20
Value of course six months later	3.50	14	1.45	2.60	5	3.16	6	1.60	3.37	8
Grade	3.50	42	2.68*	2.94	18	3.88	25	1.69	3.32	19

*P < .05

Table 24

Comparisons on Dependent Variables
Between Large and Small Classes for High Scholastic Aptitude Students
With High and Low Aspirations

Variables	High SAT - Low Aspirations: Large Class M	N	t	Small Class M	N	High SAT - High Aspirations: Large Class M	N	t	Small Class M	N
Interest toward subject matter at end of course	15.91	22	2.91	11.00	14	15.00	66	0.11	14.87	23
Interest change (+10)	9.45	22	0.80	8.54	13	9.81	64	0.44	9.43	23
Attitude toward subject matter at end of course	10.15	24	2.22*	8.04	14	10.39	65	1.64	9.46	23
Attitude change (+10)	8.87	24	0.70	8.32	14	10.02	62	2.00*	9.20	22
Course evaluation	36.37	24	1.19	33.29	14	35.83	66	1.17	33.57	23
Instructor evaluation	65.29	24	0.85	68.36	14	66.67	66	0.01	66.70	23
Value of course six months later	3.00	7	1.08	1.00	1	2.95	21	0.87	3.43	7
Grade	3.58	24	0.03	3.57	14	3.95	66	2.14*	3.52	23

*$p < .05$

of the small samples due to incomplete records on the students, further discussion of alternative explanations will not be undertaken.

Instructor internal reinforcement control

Table 25 presents data on the dependent variables comparing students from classes of high, middle, and low internal control instructors. The low group had internal control scores ranging from 0 - 14; middle group ranged 15 - 19; and high group 20 - 23. As can be seen, the instructors were higher on internal control as compared to the students. (See section on student internal control).

From Table 25 it can be seen that the hypothesis that instructors' internal control will have a positive relationship to student performance was supported to some degree. All of the significant mean comparisons between high and low, and high and middle groups were in the predicted direction. The comparisons between the middle and low groups however, present findings that are more difficult to explain. Three from the four significant t-values indicated that students in the low group performed better than the middle group. The one exception was on instructor evaluation. One possible explanation for this unexpected finding is that instructors who were low on internal control had more consistency in their beliefs than those who had middle scores. The middle group perhaps vacilated between the two perceptions: internal and external control. It may be educationally more productive to assume a particular stance and adhere to it rather than change from situation to situation. The fact that instructor evaluation was higher for the middle internal group than for the low one, may suggest that as a person the instructor with more internal control may be seen as more effective while in terms of course evaluation and attitudes toward a course, the consistency concept discussed above may be more important. For the total sample the correlation between instructor evaluation and course evaluation was +.66 (N = 898). Thus, without other influencing factors one would expect rather similar outcomes on teacher and course evaluation.

Student versus subject orientation

To test the hypothesis on the relationship between learning effectiveness and student versus subject matter orientation, classes were subdivided on median instructor response scores into high student, low subject orientation, and high subject, low student orientation groups. Scores were computed separately for the two scales: subject matter and student orientation. Internal reliability for the instruments was attested by the fact that significantly more instructors ranking in the upper half on student orientation ranked in the lower half on subject matter orientation, and vice versa. A Chi Square of 8.44 ($p < .01$) was obtained when comparisons were made on where an instructor ranked on the two

Table 25

Comparisons On Dependent Variables
Between Students In High, Middle,
And Low Internal Control Instructor Classes

Variables	High M	High N	High t	Medium M	Medium N	Medium t	Low M	Low N	High - Low t
Interest toward subject matter at end of course	14.75	387	1.28	14.30	331	1.67	14.94	286	0.52
Interest change (+10)	9.88	374	2.20*	9.33	314	1.12	9.64	280	0.92
Attitude toward subject matter at end of course	10.13	391	1.35	9.89	334	2.07*	10.25	290	0.73
Attitude change (+10)	9.86	380	3.33*	9,30	325	2.23*	9.70	283	0.95
Course evaluation	37.11	393	4.97*	34.25	336	2.56*	35.84	293	2.16*
Instructor evaluation	68.64	393	0.20	68.81	336	2.09*	66.79	293	1.98*
Value of course six months later	3.74	66	0.85	3.57	140	0.71	3.44	88	1.47
Grade	3.67	391	0.55	3.62	333	0.90	3.70	291	0.44

*$p < .05$

scales. A Chi square of 4.56 ($p < .05$) was obtained comparing instructor philosophy of education and student orientation. There was a significant tendency for student oriented faculty to have a philosophy of social development and personal identity as compared to career or intellect orientation.

Table 26 presents the results in support of the hypothesis that high student oriented and low subject oriented faculty have students with higher scores on the dependent variables. Five of the eight dependent variables were significantly different. This finding suggests that an important contributor to effective learning, in addition to conducting a class with student directiveness and structure, was the attitude of the instructor that the student is more important than the subject matter.

The hypothesis that students with social development and personal identity orientation will perform better with instructors who are high on student and low on subject matter orientation was not supported. As can be seen in Table 27 all significant mean differences were in favor of student oriented instructors, with the career and intellect oriented students actually showing more significant mean differences than the social development and personal identity oriented students.

An interesting finding was obtained regarding instructors' attitudes toward teaching as a profession, and student performance. No specific predictions were made. It was expected, however, that a positive relationship between learning effectiveness and attitudes toward teaching would be obtained. Table 28 presents the opposite findings. All five of the significant mean differences indicated that students performed better in classes with instructors having low attitudes toward teaching rather than high. High and low teaching attitude groups were determined on basis of a median cutting point.

A reason for this finding may become clear upon closer examination of the attitude scale items. It appears that the items, originally written by Miller in 1934, are not applicable in the same way today. A high positive attitude would require an instructor to agree with items, such as: "Teaching is one of the best means of serving humanity,"; "Teaching has more influence on a nation than any other profession.", " The teaching profession performs more actual good for mankind than any other ", "The intellectual standards of a country depend upon its teachers ", "The teaching profession ranks high socially ", "Teaching is one of the oldest and most honored professions ", and "Teaching offers a great deal of security."; and disagree with items, such as: "Too many teachers like to teach but can't "; "Teachers are too prone to give their own ideas and not enough facts.", " Most teachers do not understand their students ", "Teachers are too idealistic ", and "Teachers take themselves too seriously " At this period of cultural and social change the teacher is looked upon as a facilitator of learning, one who helps others to learn, rather than one

Table 26

Comparisons On Dependent Variables
Between Students In Classes With Instructors Having
High Student, Low Subject, And
Low Student, High Subject Attitudes

Variables	High student Low subject M	N	t	Low student High subject M	N
Interest toward subject matter at end of course	15.24	348	5.42*	13.16	215
Interest change (+10)	9.72	342	0.05	9.74	207
Attitude toward subject matter at end of course	10.25	353	3.02*	9.69	218
Attitude change (+10)	9.78	345	1.10	9.59	213
Course evaluation	37.32	355	3.73*	35.03	218
Instructor evaluation	70.44	355	1.89	68.66	218
Value of course six months later	3.74	87	1.97*	3.31	64
Grade	3.62	352	2.80*	3.38	218

*$p < .05$

who is an authority on expounding knowledge and wisdom. On this scale, however, a highly positive attitude appears as one that glorifies the teaching profession, is not self-critical, and is egocentric in that practically no concern is expressed for the student. Thus, the findings agree with other results in the present study showing a positive relationship between learning effectiveness and high student orientation and directiveness.

Student Response System

Table 29, 30, and 31 present results comparing the student response system introductory mathematics class with other introductory mathematics classes. As can be seen in Table 29, almost all of the dependent variables were higher for the student response class. However, only two of the mean differences: interest in course at end of the course, and instructor evaluation were significant. Thus, the hypothesis that students in the student response system class will perform better was partially supported. This finding was also in accord with previous research (Reimanis and McInroy, 1971d).

Table 27

Comparisons On Dependent Variables
Between Students In Classes With Instructors Having
High Student, Low Subject, and Low Student, High Subject Attitudes
For Career And Intellect, And Social Development And Individual
Growth Oriented Students

	Students with career and intellect orientation Instructors					Students with social development and individual growth orientation Instructors				
	High Student Low Subject			Low Student High Subject		High Student Low Subject			Low Student High Subject	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	15.24	159	3.46*	13.39	116	15.21	133	3.29*	13.03	66
Interest change (+10)	9.66	156	0.59	9.89	114	9.80	131	0.22	9.70	60
Attitude toward subject matter at end of course	10.29	160	2.20*	9.72	118	10.39	137	2.41*	9.67	67
Attitude change (+10)	9.85	155	1.20	9.53	116	9.80	135	0.50	9.66	64
Course evaluation	37.46	162	2.66*	35.17	118	37.44	137	2.16*	35.19	67
Instructor evaluation	70.50	162	1.69	68.28	118	70.72	137	0.75	69.43	67
Value of course six months later	3.75	48	2.14*	3.15	40	3.85	27	0.53	3.63	19
Grade	3.73	160	2.00*	3.50	118	3.58	137	1.29	3.40	67

*$p < .05$

Table 28

Comparisons On Depedent Variables
Between Students In Classes With Instructors Having
High and Low Attitudes Toward the Teaching Profession

Variables	Low M	N	t	High M	N
Interest toward subject matter at ebd of course	15.20	567	4.51*	13.88	449
Interest change (+10)	9.49	544	1.25	9.76	436
Attitude toward subject matter at end of course	10.24	573	2.86*	9.83	454
Attitude change (+10)	9.54	555	0.95	9.68	445
Course evaluation	36.15	577	2.08*	35.14	457
Instructor evaluation	69.66	577	5.05*	65.92	457
Value of course six months later	3.71	182	2.66*	3.30	118
Grade	3.71	575	1.78	3.59	451

*$P < .05$

Partial support was also obtained for the hypothesis that students with lower aptitude will benefit more from the student response system as compared to other students. In Table 30 it can be seen that the low aptitude group had more significant differences comparing the student response system outcomes with other classes than the high aptitude group. The low N in the student response class suggests caution in generalizing the results.

Table 31 presents results comparing the student response system group with other students after they had been divided into lower and upper half on self concept of academic ability. The hypothesis that low self concept students will benefit more from the student response system as compared to high self concept students, was not supported. As can be seen in Table 31, the high self concept students had more significant differences in favor of the student response system. Actually, all of the mean values in the high self concept group were higher for the student response system sample while three from the eight were lower for the student response group in the low self concept sample. These findings

Table 29

Comparisons On Dependent Variables
Between Students In Student Response System Mathematics Class
And Other Classes

Variables	SRS M	N	t	Others M	N
Interest toward subject matter at end of course	11.81	27	2.25*	10.01	94
Interest change (+10)	9.76	25	0.22	9.59	87
Attitude toward subject matter at end of course	9.71	27	1.74	8.70	95
Attitude change (+10)	9.75	24	0.55	9.40	89
Course evaluation	32.07	27	0.53	32.95	95
Instructor evaluation	75.63	27	3.58*	65.51	95
Value of course six months later	3.39	18	0.45	3.20	25
Grade	3.69	26	0.50	3.57	94

*$p < .05$

suggest that, whereas low aptitude students may benefit more from the careful step-by-step presentation of mathematical concepts with frequent mechanized feed-back, the low self concept students may need more varied individual attention that a regular class permits better than the student response system setting.

The hypothesis that social development and individual growth oriented students will benefit less from the student response system as compared to other classes was not supported. All philosophy of education groups performed better in the student response system class than in other classes.

Individual course comparisons

In the next step of data analysis the dependent vraiables were compared for high and low structure and high and low student directiveness groups for each course. This was done in order to examine if for some courses structure and student directiveness may be more important than for others. The results indicated a trend in favor of student directiveness and structure for all of the

Table 30

Comparisons On Dependent Variables
Between Student Response System Class And Other Classes
For High And Low Scholastic Aptitude Students

	High SAT					Low SAT				
	SRS			Other		SRS			Other	
Variables	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	10.90	10	0.94	9.53	15	14.20	5	2.22*	10.48	23
Interest change (+10)	10.20	10	0.36	9.70	13	8.40	5	0.84	9.95	21
Attitude toward subject matter at end of course	9.70	10	0.95	8.70	15	9.60	5	0.55	8.85	24
Attitude change (+10)	10.11	9	0.22	9.92	13	9.50	5	0.11	9.32	22
Course evaluation	32.10	10	0.55	33.93	15	33.80	5	0.57	31.67	24
Instructor evaluation	73.20	10	1.57	64.40	15	73.00	5	2.04	63.13	24
Value of course six months later	3.43	7	0.58	3.00	5	4.20	5	0.99	3.50	8
Grade	4.00	10	0.55	4.20	15	3.50	4	0.31	3.33	24

*$p < .05$

Table 31

Comparisons On Dependent Variables
Between Student Response System Class And Other Classes
For Students High And Low On Self Concept of Academic Ability

Variables	High Self concept of academic ability					Low Self concept of academic ability				
	SRS			Other		SRS			Other	
	M	N	t	M	N	M	N	t	M	N
Interest toward subject matter at end of course	12.14	14	2.31*	9.52	46	11.83	12	1.14	10.51	43
Interest change (10+)	11.42	12	2.16*	9.09	45	8.58	12	1.22	9.95	37
Attitude Toward subject matter at end of course	9.75	14	1.23	8.63	46	9.79	12	1.25	8.92	44
Attitude change (+10)	9.91	11	0.55	9.39	45	10.00	12	0.31	9.74	39
Course evaluation	34.78	14	0.77	33.11	46	29.58	12	1.43	33.16	44
Instructor evaluation	77.43	14	2.75*	66.76	46	73.75	12	2.13*	64.41	44
Value of course six months later	3.89	9	1.30	3.10	10	3.00	8	0.45	3.27	15
Grade	3.71	14	0.21	3.64	45	3.73	11	0.73	3.48	44

*$p < .05$

courses in the present study. The number of significant ($p < .05$) t-values ranged from two to six for the eight dependent variables, with the exception of some courses with Ns below 20 where no significant ts were obtained.

Sex comparisons

Table 32 presents results on the dependent variables comparing male and female students in male and female instructor classes. Past research has shown that female students have a tendency to have higher grades (Reimanis, 1971c). Thus, it was felt necessary to examine the sex variable. From the significant t-values in Table 32 it can be seen that, in general, male students showed more learning effectiveness with male instructors. For the female students this was not the case. Only two t-values were significant for females. One, instructor evaluation, showed higher mean value for female instructors, the other, attitude toward course at the end of the course was higher for male instructors. The results also point out that attitude, interest, instructor, and course evaluation variables were probably not influenced by the grade a student received, since females received higher grades from female instructors as compared to males from male instructors. The t-value was 2.07 ($p < .05$) comparing the two mean grades (3.60 and 3.81). There were no significant differences when male and female instructors were compared on the various instructor variables. Thus, it appears that sex in itself or a variable not studied by the present research may be an important variable in studying teaching effectiveness.

There were no significant differences when male and female students were compared on the various student variables. The tests were carried out using Chi Square and comparing the number of males with the number of females in the high and low student characteristic groups. There was, however, a significant difference in perception of student directiveness. Significantly more females were in the high student directiveness category than males ($\chi^2 = 5.02$, $p < .05$).

When female students were compared with males on the eight dependent variables after they had been subdivided into the various high and low categories on the student characteristic variables, and on perception of class structure, student directiveness, and philosophy of education groups, a rather consistent pattern appeared to be present. Practically for all comparisons, females had significantly higher grades. The only exceptions where the subcategories showed no significant differences in grades were: middle and low internal control, career, intellect and personal identity oriented philosophies, and high and low scholastic aptitude groups. The males, however, were consistently and significantly higher on the other dependent variables. From the present data it appears that female students may have had higher grades than males in practically all subgroups because in

Table 32

Comparisons On Dependent Variables
Between Students Matched On Sex With Instructors and Those Unmatched

Variable	Male Student Male Instructor M	N	t	Male Student Female Instr. M	N	Female Stud. Female Instr. M	N	t	Female Stud. Male Instr. M	N
Interest toward subject matter at end of course	14.93	386	3.96*	12.89	106	14.00	109	1.87	14.94	388
Interest change (+10)	9.71	374	0.66	9.71	101	9.61	102	0.19	9.54	376
Attitude toward subject matter at end of course	10.29	392	3.15*	9.50	109	9.54	110	2.35*	10.10	389
Attitude change (+10)	9.80	384	0.29	9.73	106	9.25	106	0.88	9.46	378
Course evaluation	36.63	394	2.78*	34.39	109	35.56	110	0.42	35.20	394
Instructor evaluation	68.58	394	0.47	67.99	109	69.87	110	2.31*	66.80	394
Value of course six months later	3.90	93	2.30*	3.33	33	3.44	32	0.17	3.39	133
Grade	3.60	392	2.72*	3.28	107	3.81	110	0.35	3.77	391

*$p < .05$

the classes with female instructors they received significantly higher grades than males (see Table 32). The same finding was not the case for males in male instructor classes. Males, however, performed better than females on other variables than grades in male instructor classes. The same was not the case for female instructor classes. The difference between grades and the other dependent variables, of course, is that grades were assigned by the instructor in most instances whereas the other variables were determined by the students.

From the present data it cannot be determined whether the sex differences were due to different response patterns, such as female students being more critical in evaluating their course experience, or whether actual differences were present in types of learning effectiveness. The fact that significantly more females perceived their classes as being student directed rather than instructor directed as compared to males seems to speak against the possibility of response pattern as an explanation of the sex difference since student directiveness was a variable that had one of the strongest positive relationships to learning effectiveness as measured by the eight dependent variables.

IV

CONCLUSIONS AND RECOMMENDATIONS

The results of the present study supported most of the hypotheses regarding direct relationships between learning effectiveness and student characteristics, instructor characteristics, and teaching methods. The results appeared to be equally applicable to the various subject matter areas and to various class sizes. Among the student characteristics that showed the strongest positive relationship to learning effectiveness were self concept of academic ability and internal reinforcement control. Debilitating anxiety had a negative relationship with learning effectiveness. Among the instructor characteristics that showed the strongest positive relationships with effective learning was the attitude that education should be oriented more toward student interests and concerns than mastering a subject matter. With respect to teaching methods, as perceived by the students, student directed, and structured classes were far superior to instructor directed, and unstructured ones.

The hypotheses concerning interaction among two or more independent variables did not receive as much support. Two independent variables, student directiveness in conducting a course, and course structure, appeared to have stronger relationships with effective learning than any other variables including scholastic aptitude. If either one of the two variables was involved in data analysis the contribution of other variables seemed relatively insignificant in comparison. Even though from a theoretical standpoint such findings are less interesting, from a practical standpoint they have important implications for teacher training programs.

The results suggest that one of the most important skills to be mastered by an instructor is the ability to elicit and use student input in designing course guidlines and structure. Two important points of clarification have to be made here. The implication of the present data is not exactly the same as with the by now well-worn phrase of "student relevance". It is not enough for the instructor to be familiar from his past experience with what may be relevant to his students and then to present his course accordingly. The students have to have a perception that their inputs, their interests are being recognized. They have to feel free to make their own decisions concerning their education; they have to become active participants in determining the direction that the course is to take. Such a process requires attributing to the community college student more maturity than has been customary even in the case of senior college or university students. Such a task is not easy to master, especially if one considers the fact that not only student perception of student directiveness was an important contributing factor to learning

effectiveness, but that the instructor's attitude toward his subject matter and the student seemed to be equally important. That is, skills alone may not be sufficient; the affective domain of attitudes also has to be involved. The instructor who felt that his students as individuals were more important than his subject matter was able to demonstrate significantly better teaching effectiveness as compared to the one who felt that his subject matter was more important than students' present interests, motives, or needs. These suggested guidlines do not, of course, imply that the subject matter of the course be ignored. Four of the variables defining effective learning dealt with interest and attitude involving the course subject matter. Using the suggested guidlines gave rise to more interest and increased positive attitudes toward the subject matter being studied. Thus, the students in such a setting, not only earned better grades, but they also left the course with feelings of interest and desire to continue learning more about the subject matter. In psychological terms, the task of the instructor is not to present his material in isolation, but to make it a part of the student's affective and cognitive structure.

The second point that needs clarification has to do with the method of conducting a student directed class. Having student directiveness in a course should not be misinterpreted as having alaissez-faire atmosphere where the instructor appears each period with the question: "What would you like to do today?". The results showed rather strongly that effective learning takes place in classes that have a definite structure. That is, students know at the beginning of the course what the course objectives are, how the course will be conducted, what are the student responsibilities regarding attendance, class participation, and criteria for evaluation and grade assignments. Thus, students' inputs have to be integrated within a course structure that is adhered to while the course is in progress.

The second set of implications from the results deals with student characteristics. Students having high self concept of academic ability, internal reinforcement control, and facilitating rather than debilitiating anxiety showed more learning effectiveness than those having low internality, self concept, and debilitating anxiety. Because of the weak relationships that these variables had with aptitude, it is the author's contention that these characteristics are not a direct result of ability. Past experience with education, the resulting habit patterns in behavior and self perception, probably, have given rise to a modus operandi that has left some students at a disadvantage in pursuing further education as compared to others. This supposition is in accord with other research at this college (Reimanis, 1970a). The present data have suggested that such students would benefit even more than others in class situations that are student directed and well structured. Secondly, as shown by past research (Reimanis, 1970a, 1970b), certain counseling techniques and special affective

education courses can serve as effective intervention techniques permitting the disadvantaged student to reexamine and change his self perception with potential benefits to his educational growth.

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